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ABSTRACT

This study described and analyzed questions that teachers ask their pupils and investigated the teachers' responses to their pupils' answers. An attempt was made to determine if teachers from different grade levels used different question-and-answer techniques during daily classroom interaction. Two hypotheses were investigated: a) no significant differences were found between second- and fifth-grade teacher groups in oral interrogatory soliciting techniques and b) no significant differences were found between second- and fifth-grade teacher groups in oral interrogatory responding techniques. Thirty minutes of verbal interaction between 10 second-grade and 10 fifth-grade teachers and their students were analyzed by five readers. The soliciting techniques were categorized according to memory; associative, ratiocinative, evaluative, and clarifying behavior; skill demonstration, rhetorical behavior, managing the classroom, and controlling behavior. The responding techniques were grouped under accepts or praises, clarifies, corrects, criticizes, asks a question, directs, and lectures. Analysis yielded acceptance of both hypotheses. Some conclusions of the investigation are a) classroom interaction emphasizes clarification of ideas, memory, and ratiocination and b) similarity between the two teacher groups was most pronounced in the responding technique. (Four tables of statistical data are presented.) (BRB)

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A STUDY OF TEACHERS' CLASSROOM QUESTIONING AND RESPONDING TECHNIQUES

by

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The educational literature abundantly testifies to the centrality, potency, and importance of teachers' questioning techniques and teacher responsiveness to pupil ideas in facilitating learning. Two of many significant benefits that may be derived from the skillful exercise of questioning and responding strategies, for example, are the development of higher cognitive processes (3,6) and the heightening of pupil interest and involvement in the learning process and in the subject matter (4). Though much has been written about the potential of these critical teacher behaviors, relatively few studies have focused on them as they are actually practiced in the everyday classroom situation under non-experimental conditions. Also, little is known about how teachers utilize or respond to the pupil answers they elicit with their questions.

The Problem

The study reported here was undertaken to describe and analyze what questions teachers ask their pupils, how teachers respond to the answers they elicit from pupils, and to attempt to determine whether teachers of different grade levels exhibit significantly different questioning and responding techniques during everyday classroom interaction.(5). It was felt that a descriptive and analytical study of such important teacher behaviors would provide present status data and instruments for the analysis of these behaviors that teacher educators and in-service directors could use in the improvement of their programs.

Hypotheses

These hypotheses stated in null form were tested at the .05 level of confidence: (1) there are no significant differences between second and fifth grade teacher groups in oral interrogatory soliciting technique, and (2) there are no significant differences between second and fifth grade teacher groups in oral interrogatory responding technique.

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Definitions

Interrogatory soliciting statements were defined as teacher-posed questions or statements containing or implying a question designed to elicit a verbal, mental, or physical pupil response. Interrogatory responding statements were defined as oral communications from the teacher to a pupil or group which were elicited or occasioned by a pupil answer to a teacher-posed question. The term "technique" referred to the over-all patterns formed by the types and frequency of oral interrogatory soliciting and responding statements of the teacher groups.

Sample

Ten second grade and ten fifth grade teachers volunteered to participate in the study. Their ages ranged from twenty-three to sixty-two years. The mean age of the subjects was 37.65 and the median age was 33.50. The mean number of years of teaching experience of the group was 11.35 and the median was 10.50. All twenty teachers held B.S. or B.A. degrees and state-issued teaching certificates. Nine teachers had M.Ed., M.S., or M.A. degrees. All of the teachers taught in a large school district located in the Southwest.

Procedures

Over a period of three months each teacher was visited on three different occasions. Thirty minutes of verbal teacher-pupil interaction were recorded on magnetic tape during each visit. Verbatim typescripts of the discourse were prepared from the tape recordings and supplemental notes taken during the taping sessions.

The teachers' interrogatory soliciting and responding statements were identified and numbered in the typescripts. A preliminary analysis of ten randomly selected typescripts revealed that, with appropriate modifications, the category system developed by Adams (1) for the analysis of teachers' questions asked during class discussion and the teacher talk categories of the Flanders system (2) were applicable to the data.

The final modified category systems, presented here with summarized definitions of each category, were as follows:

The Question Categories

1. Memory - asks for the recall or recognition of specific or general information such as facts, specific terminology, or personal experiences

2. Associative - requires the association of ideas; pupils may be asked to compare or contrast, to cite similarities and differences, to note close relationships; prompting or "cue" questions which contain clues to the answer may also fall into this category

3. Clarifying - requires that something be described, defined (pupil's own words), elaborated on, or amplified in some way; may request an illustration, example, or a more elaborated explanation of a discussion point

4. Evaluative - requires pupil to state his opinion as to the goodness, suitability, adequacy, or relative value of events, evidence, actions, procedures, and happenings by using external or internal critera

5. Ratiocinative - requires pupil to explain or justify a conclusion, opinion, or given answer, to relate the steps in reasoning that lead to a given answer, or to answer a question involving conditional inference

6. Rhetorical - frequently has a yes-no frame of reference; is often suggestive of the right answer; may be used by the teacher to support his own point of view or to indicate that a pupil omitted or forgot some aspect or detail that should have been learned or remembered

7. Skill Demonstration - requires pupil to demonstrate knowledge, proficiency, or skill in a subject area verbally and/or physically in front of the class and teacher, at the chalkboard, or by manipulating some instructional device

8. Managing the Classroom - requests which direct pupils to perform some act, to designate who will speak, read, or answer next, or which inquire into classroom mechanics or assignments

9. Controlling Behavior - requests to modify or correct unacceptable behavior; questions asked to call pupil attention to deviant behavior for purposes of correction

The Responding Categories

1. Accepts or Praises - endorsement, acceptance, affirmation, or approval of a given answer; includes praise that rewards and encourages and routine remarks of acceptance such as "O.K." and "Right"

2. Clarifies or Uses a Pupil's Answer - clarifying, developing, or building on pupil ideas; restating, giving an example, explaining, summarizing, adding to, or elaborating on a given answer (briefly)

3. Corrects - indication that an answer is incorrect, incomplete, or not wholly acceptable together with some qualification or specification added by the teacher to help the pupil arrive at a more acceptable answer; includes calling attention to a point overlooked, explaining why an answer is incorrect, giving the correct answer, or providing an opportunity for self-correction

4. Criticizes - indication that an answer is incorrect, incomplete, or unacceptable with no attempt by the teacher to help the pupil find his error or to arrive at a more acceptable response; the statement tone is primarily negative and, perhaps, punitive

5. Asks a Question - inquiries about subject matter, classroom procedures, or pupil behavior

6. Gives Directions - directions, orders, or commands requiring pupils to perform some act

7. Lectures - giving opinions about content and /or procedures; citing information not directly related to the pupil answer given, the topic under discussion, or the limits set by the question; a lengthy expository monolog by the teacher following a pupil answer

Five readers were trained in the use of the respective category systems. At the conclusion of the training period, duplicates of six typescripts randomly selected from the data group were coded independently by each reader. Coefficients of concordance (Kendall's W) were computed separately for the interrogatory soliciting and responding classifications. The coefficients for the question (interrogatory soliciting) categories ranged from .83 to .97. For the responding classifications the range was .89 to .99. All of the coefficients obtained were significant at the .01 level of confidence indicating high classificatory consistency among the readers. Four readers independently coded the final typescripts. A total of 5,416 interrogatory soliciting statements and 4,120 responding statements were classified in the final analysis.

Findings

Table I shows the percentage of interrogatory soliciting statements made by the teacher groups in each category. The data indicate that the types of questions asked by second grade teachers can be ranked from high to low in frequency of use as follows: Managing, Memory, Clarifying, Associative, Ratiocinative, Rhetorical, Evaluative, Skill Demonstration, and Controlling. For the fifth grade teachers the ranking is as follows: Clarifying, Memory, Ratiocinative, Managing, Rhetorical, Evaluative, Associative, Skill Demonstration, and Controlling.

Table I. Distribution of Oral Interrogatory Soliciting Acts of Second and Fifth Grade Teacher Groups*

Category	Second Grade Teachers %	Fifth Grade Teachers %
Memory	15.90	17.73
Associative	14.08	7.59
Ratiocinative	12.81	15.80
Evaluative	8.97	8.72
Clarifying	15.05	18.53
Skill Demonstration	4.99	2.24
Rhetorical	9.01	13.43
Managing	16.27	15.02
Controlling	2.92	.94

*Based on total Interrogatory Soliciting acts for the three records comprising 90 minutes of recorded discourse.

Table II presents the percentage of interrogatory responding statements made by the teacher groups in each category. An examination of the distribution shows that both groups respond most frequently by accepting or praising a pupil's contribution. Second in order of frequency for both groups is the strong tendency to ask another question upon receiving a pupil answer. The Clarifying or Using response is in third position for both groups. The second grade teachers are more inclined to criticize and to give directions following a pupil answer than are the fifth grade teachers. The fifth grade group tends to correct and lecture more than the second grade teachers.

Table II. Distribution of Oral Interrogatory Responding Acts of Second and Fifth Grade Teacher Groups*

Category	Second Grade Teachers %	Fifth Grade Teachers %
Accepts or Praises	45.37	40.57
Clarifies or Uses	9.56	11.68
Corrects	3.49	6.36
Criticizes	4.78	3.56
Questions	29.45	27.71
Directs	3.37	2.71
Lectures	3.98	7.41

*Based on total Interrogatory Responding acts for the three records comprising 90 minutes of recorded discourse.

A two-way analysis of variance was used to determine whether there were significant differences between the teacher groups. The results of the analysis of variance of teachers' interrogatory soliciting technique are presented in Table III. The results of the analysis of variance of teachers' responding technique are presented in Table IV. In order to have a common basis for comparison, the category frequencies were converted to proportions and treated as scores in the analysis.

As may be observed from the tables, no significant differences between second and fifth grade teacher groups in interrogatory soliciting or responding technique were discovered. Also no significant interaction effects were found for interrogatory soliciting and responding technique depending on grade level taught.

In view of these findings, the null hypotheses were accepted. However, an inspection of the category means of the two groups revealed a large observed difference between groups in the question category of Association and in the responding category of Lecture. The t-test of significance revealed that second grade teacher subjects asked significantly more (.05) Associative questions than the fifth grade teachers. The results of the analysis of the Lecture category showed that the

Table III. Oral Interrogatory Soliciting Acts of Second and Fifth Grade Teachers

Source of Variation	Sum of Squares	df	Variance Estimate	F Ratio
Between Groups (Second and Fifth)	4,610	1	4,160	.01
Between Categories	48,249,394	8	6,031,174	18.89*
Interaction: Groups x Categories	4,956,400	8	619,550	1.93
Within Ss	51,712,754	162	319,215	
Total	104,923,158	179		

*Significant beyond .01 level.

Table IV. Oral Interrogatory Responding Acts of Second and Fifth Grade Teachers

Source of Variation	Sum of Squares	df	Variance Estimate	F Ratio
Between Groups (Second and Fifth)	26,717	1	26,717	.06
Between Categories	286,312,632	6	47,718,772	103.16*
Interaction: Groups x Categories	2,611,722	6	435,287	.94
Within Ss	58,280,734	126	462,545	
Total	347,231,805	139		

*Significant beyond .01 level.

difference, though large, was not significant. Significant differences among the respective categories distinguishing interrogatory soliciting and responding techniques were found.

Discussion

The findings of this investigation prompted the following conclusions and implications:

1. The teacher groups utilized similar questioning and responding techniques. The similarity was most pronounced in the area of responding technique.

Implications: It appears that teachers differentiate their questioning and response-handling techniques to provide for differences in mental maturity, home background, and levels of achievement more by shifts in emphasis than by large variations in techniques. It may be that only a few teachers vary their techniques in response to pupil differences to any significant degree.

2. The teacher groups utilized a variety of questions to achieve instructional objectives.

Implications: Teachers seem to implement the shifts of emphasis to meet individual instructional needs by qualitative rather than quantitative differentiation of the questions they ask. The variety of questions asked during classroom interaction suggests this possibility. Teacher use of different kinds of questions is also suggestive of the flexibility and mental agility required to facilitate learning and of the complex and fluid nature of teaching in general.

3. The incidence of questions pertaining to classroom management and control of pupil behavior suggests that classroom administration claims a definite though unspecified amount of time in the classrooms studied, and, probably in most elementary school classrooms.

Implications: When the finding that from sixteen to nineteen per cent of the questions asked functioned to implement classroom administration is considered, it is clear that skill in classroom management and control of pupil behavior is an important teacher competency. This raises the question as to the extent of administrative functions performed by teachers if a broader spectrum of teacher behaviors were analyzed. Other studies such as the one conducted by Hughes and Associates (4) have shed light on this question.

4. The significantly greater use of Associative questions by second grade teachers may be related to the level of cognitive functioning of their pupils and to certain subjects and skills emphasized in the primary grades.

Implications: It is cause for speculation as to why the fifth grade teachers did not make greater use of this type of question. The Associative question is very useful for encouraging children to recall, relate, and apply past experiences to the mastery of new and unfamiliar concepts and skills. It is also a versatile question which can be formulated to function at ascending levels of complexity. It can give wide play to such broadly applicable skills as observation, differentiation, discrimination, comparison, and contrast and can encourage the use of all the senses in the acquisition of knowledge.

An examination of the distribution of questions asked by the fifth grade teachers relative to this question suggests that they might be using Rhetorical or Clarifying questions for associative purposes. If this is true, it is unfortunate that the Rhetorical question in particular is being used rather than the Associative question. Rhetorical questions require little mental activity on the part of pupils and are, by and large, lecturing statements made to give information rather than to stimulate thinking.

5. The intellectual climate prevailing in the classrooms, as inferred from the types and frequency of questions asked, may be characterized as emphasizing the clarification and elaboration of ideas, memory, and ratiocination.

Implications: Teachers are giving attention to the nurture of both divergent and convergent thinking abilities judging by the relatively liberal use of Clarifying and Ratiocinative questions. The Clarifying question is often an open-ended question (e.g., "What else?" "Can you tell us more?" "Are there any other ideas?") which invites the child to generate many ideas, suggest alternatives, reconstruct and reinterpret learned concepts and facts, and elaborate on given data. Though usually more convergent in character, Ratiocinative questions invite children to

exercise divergent thinking by asking them to formulate hypotheses, predict outcomes, draw conclusions, and to generalize.

6. Two basic responding patterns were apparent in the classrooms studied. First, the teacher asked a question, obtained an answer, and accepted or praised the answer in a rather routine fashion. Second, the teacher asked a question, obtained an answer, then followed with another question.

Implications: With forty to forty-five per cent of the responding acts of the teacher groups falling into the Accepts or Praises category, it would appear that the teachers are responding to pupil ideas in a routine and, perhaps, habitual and perfunctory manner. The high incidence of "O.K." and "Right" responses suggests this. Routine responses of this type would tend to narrow the range of intellectual exploration and to channel thought in the direction of the "right" answer which would evoke acceptance or praise from the teacher. Another way of interpreting this finding is that teachers are open to and accepting of both divergent and convergent pupil contributions. An analysis of the teacher question, pupil answer, teacher response sequence as it relates to teacher toleration and acceptance of divergent responses, a task for a future study, would provide some answers to this important question.

The relative lack of variety in teachers' responding patterns suggests an area of concentration for teacher education programs. Teachers could be taught to use a wider range of responding statements to encourage children to generate more ideas, offer more responses, and, generally, to increase their participation in the learning process. For instance, the clarification or use of a pupil idea is a more instructive, stimulating, and powerful form of recognition than is simple acceptance or praise. Also, the Clarifying or Using response places the child squarely at the center of the learning process and makes his ideas, rather than those of the teacher, the entrees and springboards to further learning.

7. From the low incidence of criticizing acts, it may be concluded that the teachers were generally kind to the children and tolerant of errors. When they had to correct, they did it in a personally supportive rather than in a personally critical manner.

Implications: Another corrective strategy employed by teachers is the use of a Clarifying or Associative question to help children see and correct their own misconceptions and misinformation. In this case, the following sequence would prevail: the teacher asks a question, receives an incorrect or incomplete answer, then responds with a Clarifying inquiry which questions the accuracy or validity of the answer and gives the child another opportunity to answer and to correct himself if he can. On the other hand, the teacher might respond with an Associative question that gives the child a clue or redirects his thinking toward the correct answer.

8. In view of the variety of questions asked and the relative uniformity of their frequency of occurrence, it seems that the cognitive process of memory was not over-emphasized in the selected classrooms. However, by comparison with the emphasis given to other cognitive processes, evaluative thinking was under-emphasized.

Implications: Teachers are not giving children many opportunities to think critically, make decisions, or to formulate opinions in the classrooms studied. The evaluative function seems to be the prerogative of the teacher and only rarely is it shared with the pupils.

Summary

The purposes of this study were to: (1) describe, analyze, and compare the oral interrogatory soliciting and responding behaviors of selected second and fifth grade teachers; and (2) determine whether there were significant behavioral differences between them in terms of the types and frequency of questions asked and responding statements made during classroom interaction.

Thirty minutes of verbal interaction between the ten second grade and the ten fifth grade teacher subjects and their classes were tape-recorded on three different occasions. The recordings were transcribed and the units of analysis were isolated.

A preliminary analysis indicated that two existing classificatory instruments, with appropriate modifications, were applicable to the data. The final instrument used for the analysis of teachers' interrogatory

soliciting statements contained Memory, Associative, Ratiocinative, Evaluative, Clarifying, Skill Demonstration, Rhetorical, Managing the Classroom, and Controlling Behavior categories. The instrument for the analysis of teachers' responding statements contained the categories of Accepts or Praises, Clarifies or Uses, Corrects, Criticizes, Asks a Question, Directs, and Lectures.

Five readers were trained in the use of the instruments. At the conclusion of the training period, each reader independently coded duplicate copies of six typescripts. Coefficients of concordance (Kendall's W) computed for the interrogatory soliciting classifications ranged from .83 to .97 and for the responding classifications from .89 to .99. Because the obtained coefficients indicated high classificatory consistency among the readers, the sixty type-scripts were coded without additional reader training.

A two-way analysis of variance revealed no significant between-group differences in over-all interrogatory soliciting or responding technique. A test of the interaction terms showed no significant interaction effects. A t-test located a significant difference in favor of the second grade group in the use of Associative questions.

A descriptive analysis of the interrogatory soliciting statements revealed that the second grade teachers asked significantly (.05) more Associative questions and tended to ask more Managing and Skill Demonstration questions than the fifth grade group. The fifth grade teachers asked more Memory, Ratiocinative, Clarifying, and Rhetorical questions. Both groups asked about the same proportion of Evaluative questions. The second grade teachers emphasized the cognitive processes of memory, association, ratiocination, and evaluation in that order. The order of emphasis for the fifth grade group was memory, ratiocination, evaluation, and association.

An analysis of the responding statements showed that both groups responded most frequently by accepting or praising pupil answers and, secondly, by following pupil replies with another question. The second grade teachers accepted or praised, criticized, questioned, and directed

more. The fifth grade group clarified or used a pupil's answer, corrected, and lectured more.

Some major conclusions drawn from this investigation were: (1) The teacher groups utilized a good variety of questions to achieve instructional objectives; (2) as inferred from the questions asked, the intellectual climate in the classrooms studies was characterized as emphasizing the clarification and elaboration of ideas, memory, and ratiocination; (3) the teachers generally reponded to pupil contributions in a rather routine and accepting manner; (4) from the variety of questions asked, it appeared that memory was not over-emphasized in the classrooms studied; however, by comparison with the emphasis given to other cognitive processes, evaluative thinking was under-emphasized; and (6) the teachers used similar oral interrogatory soliciting and responding techniques and the similarity was most pronounced in the area of responding technique.

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